the coils is zero, and, thus, net current is zero. In this way, the coil pair can be considered isolated from the external coil. By the principle of reciprocity, with such an arrangement, any B-field produced by the coil pair should produce a net B-flux through the external coil of zero as well. The coil pair can produce a B-field with a component that has a zero crossing in a plane through the external coil, as shown in Figure 16B. In this way, both positive and negative contributions to the total B-flux exist which cancel upon integration over said plane. This is what is referred to as a zero-flux contour. One skilled in the art will recognize that this is equivalent to saying that the said coil and the external coil pair have zero mutual inductance.

In the claims:

Please substitute the following claims:

Claim 1 (amended):

A coil configuration for a magnetic resonance imaging system, comprising:

a pair of coils in an opposite rotation orientation associated with a first magnetic field in a region of interest, wherein the first magnetic field and the second magnetic field are substantially parallel in the region of interest; and

a single coil associated with a second magnetic field in the region of interest, wherein the single coil is positioned at an essentially zero-flux contour with respect to the first magnetic field.

Claim 38 (amended):

A RF coil configuration for a magnetic resonance imaging system, comprising:

a plurality of RF coils with bilateral symmetry,

wherein said plurality of RF coils is associated with a plurality of modes such that the number of modes is less than or equal to the number of RF coils, wherein said plurality of modes correspond

with a plurality of current patterns, each of said plurality of current patterns having zero net mutual inductive coupling to each of the other of said plurality of current patterns in a region of interest.

Claim 39 (amended):

The configuration according to claim 38, further comprising:

a means for utilizing the plurality of RF coils for detecting magnetic fields associated with the plurality of current patterns.

Claim 40 (amended):

The configuration according to claim 38, further comprising:

a means for utilizing the plurality of RF coils for generating magnetic fields associated with the plurality of current patterns.

Claim 41 (amended):

A method of detecting magnetic fields in a magnetic resonance imaging system, comprising the following steps:

detecting a first magnetic field in the field of interest utilizing a pair of coils in an opposite rotation orientation associated with the first magnetic field in a region of interest, wherein the first magnetic field and the second magnetic field are essentially parallel in the region of interest; and

detecting a second magnetic field in the region of interest utilizing a single coil associated with the second magnetic field in the region of interest,

wherein the single coil is positioned at an essentially zero-flux contour with respect to the first magnetic field.

Claim 45 (amended):

A method of detecting magnetic fields in a magnetic resonance imaging system, comprising the following steps:

positioning a plurality of RF coils with respect to a region of interest such that the plurality of RF coils support a plurality of modes corresponding to a plurality of current patterns; and

detecting the plurality of modes associated with the plurality of RF coils,

wherein the number of RF coils is greater than or equal to the number of modes, and wherein each of the plurality of current patterns has zero net mutual inductive coupling to each of the other of the plurality of current patterns in a region of interest.

Please cancel claims 18-24, 27-35, and 42-44.